

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 – 4 (canceled).

Claim 5 (currently amended): The A method of ~~claim 4~~, wherein forming a trench for use in manufacturing a semiconductor device, said method comprising:

forming one of an oxide film, a fluoride film and a nitride film as an insulation film on a substrate;

forming a photoresist pattern on the insulation film;

performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film; and

subsequently performing a second etching process that is distinct from said first etching process, the second etching process comprises comprising wet etching the insulation film, in which the initial trench has already been formed, to thereby enlarge the initial trench by immersing the substrate into a bath containing an etching solution.

Claim 6 (currently amended): The A method of ~~claim 4~~, wherein forming a trench for use in manufacturing a semiconductor device, said method comprising:

forming one of an oxide film, a fluoride film and a nitride film as an insulation film on a substrate;

forming a photoresist pattern on the insulation film;

performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film; and

subsequently performing a second etching process that is distinct from said first etching process, the second etching process ~~comprises~~ comprising wet etching the insulation film, in which the initial trench has already been formed, to thereby enlarge the initial trench by spraying an etching solution onto the insulation layer while the substrate is being rotated.

Claim 7 (currently amended): The A method of ~~claim 4, wherein~~ forming a trench for use in manufacturing a semiconductor device, said method comprising:

forming one of an oxide film and a fluoride film as an insulation film on a substrate;

forming a photoresist pattern on the insulation film;

performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film; and

subsequently performing a second etching process that is distinct from said first etching process, the second etching process ~~comprises~~ comprising wet etching the insulation film, in which the initial trench has already been formed, to thereby enlarge the initial trench by wetting the insulation film with an etching solution that etches an oxide or fluoride.

Claim 8 (original): The method of claim 7, wherein the etching solution includes hydrogen fluoride (HF), ammonium fluoride (NH₄F), hydrogen peroxide (H₂O₂) and deionized water (H₂O).

Claim 9 (original): The method of claim 8, wherein the etching solution includes hydrogen fluoride, ammonium fluoride and deionized water in a volume ratio of about 1:1-10:1-10:100-500.

Claim 10 (original): The method of claim 7, wherein said second etching process comprises etching the insulation film at a rate of about 40 to about 60 Å/minute.

Claim 11 (original): The method of claim 7, wherein the etching solution further comprises an antioxidant.

Claim 12 (original): The method of claim 11, wherein the antioxidant comprises benzo triazole (BTA).

Claim 13 (currently amended): The A method of claim 4, wherein forming a trench for use in manufacturing a semiconductor device, said method comprising:

forming a nitride film as an insulation film on a substrate;
forming a photoresist pattern on the insulation film;
performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film; and
subsequently performing a second etching process that is distinct from said first etching process, the second etching process comprising wet etching the insulation film, in which the initial trench has already been formed, to thereby enlarge the initial trench by wetting the insulation film with an etching solution that etches a nitride.

14. (original) The method of claim 13, wherein the etching solution includes hydrogen fluoride, phosphoric acid (H₃PO₄) and deionized water.

15. (original) The method of claim 13, wherein the etching solution further comprises an antioxidant.

16. (original) The method of claim 15, wherein the antioxidant includes benzo triazole.

Claims 17 – 22 (canceled).

Claim 23 (currently amended): ~~The A method of claim 21, wherein~~ forming a conductive pattern for use in manufacturing a semiconductor device, said method comprising:

forming an insulation film on a substrate;
forming a photoresist pattern on the insulation film;
performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film;
subsequently performing a second etching process that is distinct from said first etching process, said second etching process being a wet etching process and comprising etching the insulation film, in which the initial trench is already formed,
~~the second etching process is performed~~ using etching solution including hydrogen fluoride, phosphoric acid and deionized water to thereby enlarge the initial trench; and
depositing a conductive material in the enlarged trench to form a conductive pattern in the insulation film.

Claim 24 (canceled).

Claim 25 (currently amended): ~~The A method of claim 24, wherein~~ forming a conductive pattern for use in manufacturing a semiconductor device, said method comprising:

forming an insulation film on a substrate;
forming a photoresist pattern on the insulation film;

performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film;

subsequently performing a second etching process that is distinct from said first etching process, the second etching process is performed being a wet etching process and comprising etching the insulation film, in which the initial trench is already formed, using an etching solution including benzo triazole to thereby enlarge the initial trench; and

depositing a conductive material, comprising copper, aluminum or tungsten, in the enlarged trench to form a conductive pattern in the insulation film, wherein the etching solution including the benzo triazole prevents to prevent the conductive material from oxidizing.

Claim 26 (canceled).

Claim 27 (new): The method of claim 5, further comprising removing the photoresist pattern after the initial trench is formed and prior to the second etching process.

Claim 28 (new): The method of claim 6, further comprising removing the photoresist pattern after the initial trench is formed and prior to the second etching process.

Claim 29 (new): The method of claim 7, further comprising removing the photoresist pattern after the initial trench is formed and prior to the second etching process.

Claim 30 (new): The method of claim 13, further comprising removing the photoresist pattern after the initial trench is formed and prior to the second etching process.

Claim 31 (new): The method of claim 5, wherein said enlarging the initial trench comprises increasing a width of the initial trench while maintaining a depth of the initial trench.

Claim 32 (new): The method of claim 6, wherein said enlarging the initial trench comprises increasing a width of the initial trench while maintaining a depth of the initial trench.

Claim 33 (new): The method of claim 7, wherein said enlarging the initial trench comprises increasing a width of the initial trench while maintaining a depth of the initial trench.

Claim 34 (new): The method of claim 13, wherein said enlarging the initial trench comprises increasing a width of the initial trench while maintaining a depth of the initial trench.